PATENT COOPERATION TREATY

PCT

TRANSLATION INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

1	or agent's file reference	FOR FURTHER ACTION		See Form PCT/IPEA/416	
International application No.		International filing date (day/n	nonth/year)	Priority date (day/month/year)	
PCT/EP2004/012438		03.11.2004		07.11.2003	
Internationa	l Patent Classification (IPC) or na	 ational classification and IPC			
H01L3	H01L33/00				
Applicant TRIDC	NIC OPTOELECTRO	ONICS GMBH			
		liminary examination report, esta the applicant according to Article		nternational Preliminary Examining Authority	
2. Th	is REPORT consists of a total of	8	sheets, including	g this cover sheet.	
3. Th	is report is also accompanied by	ANNEXES, comprising:			
a.	(sent to the applicant ar	nd to the International Bureau) a t	otal of 5	sheets, as follows:	
	sheets of the descri	ription, claims and/or drawings w	hich have been a	mended and are the basis for this report and/or le 70.16 and Section 607 of the Administrative	
	sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental				
	Box.				
b.	(sent to the International	al Bureau only) a total of (indicate	type and number	r of electronic carrier(s))	
	, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see				
	Section 802 of the Admin	•	ed in the Supplei	mental Box Relating to Sequence Listing (see	
4. Th	is report contains indications rela	nting to the following items:			
	Box No. I Basis of t	he report			
	Box No. II Priority				
	Box No. III Non-estat	olishment of opinion with regard to	o novelty, inventi	ive step and industrial applicability	
	Box No. IV Lack of u	nity of invention			
	BOX 110. V	statement under Article 35(2) with and explanations supporting such s		ty, inventive step or industrial applicability;	
	Box No. VI Certain de	ocuments cited			
	Box No. VII Certain de	efects in the international applicati	on		
	Box No. VIII Certain ol	oservations on the international ap	plication		
Date of submission of the demand		Date of	completion of thi	s report	
			-		
Name and mailing address of the IPEA/EP		Authoriz	Authorized officer		
Facsimile N	0.	Telepho	ne No.		

International application No.
PCT/EP2004/012438

Вох	No. I	Basis of the report		
1.		n regard to the language, this report is based on the interna cated under this item.	tional application in the language in	which it was filed, unless otherwise
		This report is based on translations from the original lang which is the language of a translation furnished for the pu		,
		international search (Rule 12.3 and 23.1(b))		
		publication of the international application (Rule 12	2.4)	
		international preliminary examination (Rule 55.2 at	nd/or 55.3)	
2.	rece	n regard to the elements of the international application, the iving Office in response to an invitation under Article 14 report):		
		the international application as originally filed/furnished		
	\boxtimes	the description:		
		pages <u>1-11</u>		as originally filed/furnished
		pages*	received by this Authority on	
		pages*	received by this Authority on	
	\boxtimes	the claims:		
		nos.		as originally filed/furnished
		nos.*	as amended (togethe	er with any statement) under Article 19
		nos.* 1-22	received by this Authority on	/filed with the demand
		nos.*	received by this Authority on	
	\bowtie	the drawings:		
		sheets 1/3-3/3		as originally filed/furnished
		sheets*		
		sheets*		
		a sequence listing and/or any related table(s) – see Supple		
	\square		chichiai Box Relating to sequence 1	nsung.
3.		The amendments have resulted in the cancellation of:		
		the description, pages		
		the claims, nos. 23–25		
		the drawings, sheets/figs		
				_
			1	
4.	\bowtie	This report has been established as if (some of) the ame they have been considered to go beyond the disclosure as		
		the drawings, sheets/figs		
		the sequence listing (specify):		
		any table(s) related to sequence listing (specify):		
*	If ite	em 4 applies, some or all of those sheets may be marked "s	uperseded."	

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Вох	x No. IV Lack of unity of invention
1.	In response to the invitation to restrict or pay additional fees the applicant has: restricted the claims. paid additional fees. paid additional fees under protest. neither restricted the claims nor paid additional fees.
2.	This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3.	This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is: complied with. not complied with for the following reasons:
4.	Consequently, this report has been established in respect of the following parts of the international application: all parts. the parts relating to claims Nos.

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Box No. V		Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement			
1.	Statement				
	Novelty	(N)	Claims _	1-22	YES
	Inventiv	e step (IS)	Claims		YES
			_	1-22	
	Industria	ıl applicability (IA)		1-22	
			_		
2.		d explanations (Rule 70	0.7)		
	3.	Reference	is ma	de to the following documents:	
		D1: US-B1	-6 49	98 355 (HARRAH SHANE ET AL)	
		24 De	ecembe	er 2002 (2002-12-24)	
		D2: WO 02	2/0892	21 A (MATSUSHITA ELECTRIC WORKS	
		LTD;	SHIOH	HAMA EIJI (JP); KUZUHARA ITUKOU (J)	
		7 Nov	ember	2002 (2002-11-07)	
		D2a: EP-1	398 8	339 A1 (MATSUSHITA ELECTRIC WORKS	
		LTD)	17 Ma	arch 2004 (2004-03-17)	
		D3: WO 03	3/0196	779 A (MATSUSHITA ELECTRIC WORKS	
		LTD;	SHIOH	HAMA EIJI (JP); SUGIMOTO MASARU (J)	
		6 Mar	ch 20	003 (2003-03-06)	
	4.	The preser	nt. app	olication does not meet the	
	-	_		PCT Article 33(1) because the	
		_		of claims 1, 21 and 22 does not	
		_		entive step (PCT Article 33(3)).	
		invoive ar	1 1110	merve beep (For merere 33 (3)).	
	4.1	Document D)1 is	considered the prior art closest to	
		the subjec	ct mat	ter of claims 1, 21 and 22 and	
		discloses	(see	figures 3 and 4) a light-emitting	
		diode arra	ngeme	ent comprising a light-emitting	
		diode chip	(28)	, a multi-layer board (6-8-10) with	

Box No. V

a metal base (6), and an electrically insulating and thermally conductive bonding layer (24) between the emission surface of the light-emitting diode chip and the board, an intermediate carrier (30) being disposed between the light-emitting diode chip and the board.

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;

- 4.2 The subject matter of claim 1 thus differs from the known light-emitting diode arrangement in that the intermediate carrier is formed from an aluminium nitride substrate. It is known in the art, however, to use aluminium nitride substrates as intermediate carriers when good electrically insulating and thermally conductive properties are wished for. The subject matter of claim 1 therefore cannot be considered inventive.
- In addition, the use of colour conversion substances disposed above and next to the light-emitting diode chip and the application of the light-emitting diode chip using conductive glue are conventional features (see, e.g., D2, figure 93 in conjunction with D2a, paragraph [0076]; and D2, figure 22 in conjunction with D2a, paragraph [0058]). The subject matter of claims 21 and 22 therefore fails to involve an inventive step.
- 5. Dependent claims 2-20 do not contain any features which, in combination with the features of any claim to which they refer, meet the PCT requirements for inventive step. D1 discloses the

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
	additional features of claims $2-4$, $11-13$, $15-17$
	and 20; the features of claims $5-10$ are disclosed
	in D3 and those of claims 14 and $18-20$ in D2.
6.	The subject matter of claims $1-22$ is industrially
	applicable and therefore meets the requirements of
	PCT Article 33(4).

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient. Continuation of: $Boxes\ I$ and IV

Box I

Basis of the report

- 1. The International Searching Authority is of the opinion that some of the amendments filed with the demand go beyond the disclosure in the international application as filed.
- 1.1 The original description discloses the use of an intermediate carrier only in conjunction with light-emitting diode chips arranged such that the substrate of the light-emitting diodes faces away from the board ("face down"). Claims 1-12, 21 and 22 therefore go beyond the disclosure of the application, since they claim protection for light-emitting diodes that are mounted differently.
- 1.2 For the interpretation of claims 1-12, 21 and 22, this report thus assumes that what is concerned are light-emitting diode arrangements in which the substrate of the light-emitting diodes faces away from the board.

Box IV

Lack of unity of invention

The International Searching Authority has determined that this international application

Supplemental Box

contains multiple (groups of) inventions, as
follows:

Group 1: claims 1-22

Light-emitting diode arrangement comprising a light-emitting diode chip, a multi-layer board with a base made of a good thermally conductive material, and an electrically insulating and thermally conductive bonding layer between the emission surface of the light-emitting diode chip and the board.

Group 1.1: claims 4-20

Arrangement in which a light-emitting diode chip is accommodated in a hollow in a board.

2.1 Independent claims 1 and 4 are linked merely by the concept of applying a light-emitting diode to a board, which is routine practice for a person skilled in the art. The additional features of independent claim 1 solve the problem of heat dissipation, whilst those of claim 4 (when it does not refer back to the preceding claims) are used to planarise the arrangement. The additional, different features of claims 1 and 4 are therefore not equivalent, since they do not solve the same technical problem.